

ORDINANCE NO. 8-1-85

AN ORDINANCE OF THE CITY OF ROWLETT, TEXAS

PROVIDING FOR COMPREHENSIVE DRAINAGE AND STORMWATER CONTROL IN THE CITY OF ROWLETT: PROVIDING A TITLE; DECLARING THE PURPOSE AND SCOPE; PROVIDING STANDARD PROVISIONS; RESPONSIBILITY OF OWNER OR DEVELOPER FOR STORM DRAINAGE; PROVIDING REQUIREMENTS FOR ENGINEERING DESIGN INCLUDING DETENTION AND RUNOFF CONTROL: PROVIDING FOR CONSTRUCTION IN AREAS SUBJECT TO FLOODING; PROVIDING FOR BUILDING OR STRUCTURE SET-BACK REQUIREMENTS; PROVIDING FOR MINIMUM LOT AND FLOOR ELEVATIONS; PROHIBITING THE ISSUANCE OF BUILDING PERMITS, PLAT AND SITE PLAN APPROVAL TO BE WITHHELD; PROVIDING FOR MAINTENANCE GUARANTEE; FIXING DUTIES OF THE CITY ENGINEER AND APPEAL TO THE CITY COUNCIL; PROVIDE A REPEALING CLAUSE; PROVIDING A SEVERABILITY CLAUSE; DECLARING AN EMERGENCY.

NOWHEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF ROWLETT, TEXAS:

SECTION I - ADOPTION - TITLE

This Ordinance is hereby adopted and shall be known as the "Official Drainage and Stormwater Control Ordinance" of the City of Rowlett.

SECTION II - PURPOSE AND SCOPE

The purpose set forth herein is to insure adequate stormwater drainage and flood control within the City of Rowlett, and to protect public health and safety, to minimize property damage due to flooding, to limit runoff rates to equitably distribute the cost of necessary drainage improvements, and to minimize the maintenance cost of drainage facilities constructed. Any development or improvement of property affecting storm drainage and flood control in the City of Rowlett is subject to the provisions of this Ordinance and the Flood Hazard Prevention Ordinance (Ordinance No. 3-2-78B). It also applies to individual building structures, subdivisions, excavation and fill operations.

SECTION III - STANDARD PROVISIONS

All construction for storm drainage in the development or improvement of property within the City of Rowlett shall conform to the following Standards and Requirements:

A. Storm sewer inlets shall be provided along paved streets at such intervals as are necessary to limit the depth of flow as follows:

1. RESIDENTIAL STREETS - Based on parkway slopes of 1/4 inch per foot behind the curb, the 100 year Design Frequency flows shall not exceed a depth of 1 1/2 inches over the top of curb. A maximum flow of 45 cfs will be allowed in the street.

2. COLLECTOR STREETS - Based on parkway slopes of 1/4 inch per foot behind the curb, in INDUSTRIAL AND COMMERCIAL areas, the 100 year Design Frequency flows shall not exceed a depth of 1/2 inch over the top of curb. A maximum flow of 45 cfs will be allowed in the street.

3. MAJOR THOROUGHFARES - Based on a transverse slope of 1/4 inch per foot on the pavement, the 100 year Design Frequency flow shall not exceed the elevation of the lowest top of curb. A maximum of 45 cfs will be allowed in the street.

4. ALLEYS - The 100 year Design Frequency flows shall not exceed the capacity of the alley sections. A maximum of 45 C.F.S. will be allowed for an alley with curbs, and 25 C.F.S. for alleys without curbs.

5. POSITIVE OVERFLOW - The approved drainage system shall provide for positive overflow at all low points. The term "positive overflow" means that when the inlets do not function properly, or when the design capacity of the conduit is exceeded, the excess flow can be conveyed over land along a paved course. Normally, this would mean along a street or alley, but can require the dedications of special drainage easements on private property.

B. A closed storm sewer system shall be required to accommodate a run-off exceeding the street capacity, as provided above, up to and including the design capacity of a seventy two (72") inch concrete pipe. The following are recommended maximum design velocities:

Culverts	15 fps
Inlet Laterals	10 fps
Storm Sewers	12.5 FPS

Discharge velocities cannot exceed the permitted velocity of the channel or conduit at the outfall.

C. An open channel may be permitted to accommodate run-off exceeding the design capacity of a seventy-two inch pipe, as provided below:

(1) Channels draining an area with a "CA" factor (coefficient to runoff and drainage area, as used in the hereinafter described "rational formula") of less than 600 shall be concrete lined to the design depth, plus six inch freeboard except that a closed system as provided above may be used. A twenty foot wide access easement shall be provided along at least one side parallel to channel. The top width of the channel at the design depth must not exceed 50' unless specifically approved by the City Engineer.

(2) Channels draining an area with a "CA" factor between 600 and 1,000 shall be improved to a capacity of the 100 year design discharge by excavation, straightening and realignment. The construction of a concrete lined channel shall have a width of not less than the bottom width with concrete lined to a depth of at least three feet on the banks. Earthen side slopes shall be no steeper than 4:1, horizontal to vertical, and shall have approved ground cover to prevent erosion.

Where drainage conditions or velocities of water will exceed that condition which would create erosion, provisions shall be made for the placement of riprap, gabion, etc., along the stream, and channel banks by the developer.

(3) Channels draining an area with a CA factor over 1,000 shall be designed to carry the capacity of a 100 year flood frequency storm. The specific design and type of construction improvements for this drainage facility shall have specific approval by the City Engineer after review of the maintenance, erosion and site conditions.

(4) All areas of an earth Channel Section shall be improved by the Developer with a low maintenance vegetation as approved by the City Engineer, prior to planting. The selection of materials shall comply with the current ground cover listing for North Central Texas furnished through the Texas Agricultural Extension Service.

(5) The setback for the building line shall be as follows:

a. A maintenance strip shall be provided with a twenty (20) foot width along each side of the top of the channel unless approved otherwise by the City Engineer and shown on the file plat.

b. A drainage flume section which provides for limited flow of storm water shall be located within a drainage easement of sufficient width which permits future maintenance accessibility.

D. A drainage feature which is to remain in its natural state of native growth may be accepted by the City to remain as an unimproved facility so long as the water conveyance capacity of the area is adequate to handle the future drainage requirements.

E. In lieu of the improvements of a channel draining an area with a "CA" factor in excess of 600, the City Council may elect to accept the dedication of all land within the 100-year floodway of the existing drainage channel as a permanent drainage right-of-way.

F. The criteria for drainage improvements as herein-above set forth in Paragraphs A through D of this section shall be applicable to publicly owned lands solely at the discretion of the City of Rowlett.

G. Excavation, fill and grading operations within the City Limits shall be undertaken only after a proper permit has been obtained from the City Engineer. Failure to obtain the proper permit shall result in the requirement for the Developer to replace the soils, as required by Chapter 70 of the Appendix of the 1982 Edition of the Uniform Building Code.

H. Easements - Drainage and floodway easements shall be provided for all open channels. Easements shall encompass all areas beneath a ground elevation defined as being the highest elevation of the following:

1. One (1) foot above a design storm having a recurrence interval of 100 years, calculated by the City's criteria.

2. The top of the high bank.

3. Maintenance access.

I. Ground Cover - Any ground cover or vegetation which is planted and is a part of the improvement project will not be accepted by the City until the growth has been established and maintained by the developer for a one (1) year time period.

SECTION IV. - RESPONSIBILITY OF OWNER OR DEVELOPER FOR STORM DRAINAGE

A. The owner or developer of property to be developed shall be responsible for all storm drainage flowing through or abutting such property. This responsibility includes the drainage directed to that property by ultimate development as well as the drainage naturally flowing through the property by reason of topography. It is the intent of this Ordinance that provision be made for storm drainage in accordance with Section III above, at such time as any property affected is proposed for development, use or modification.

B. Where the improvement or construction of a storm drainage facility is required along a property line common to two or more owners, the owner hereafter proposing development of his property shall be responsible for the required improvements at the time of development, including the dedication of all necessary right-of-way or easements, to accommodate the improvements.

C. Where a property owner proposed development or use of only a portion of his property, provision for storm drainage in accordance with Section III above shall only be required in that portion of the property proposed for immediate development, except as construction or improvements of a drainage facility outside that designated portion of the property is deemed essential to the development of that designated portion.

D. When a property owner proposes a development, provisions shall be made in the development plan for control of excess siltation and downstream erosion.

E. The owner or owners shall dedicate to the City, the required drainage easements. Determination of minimum easement required shall be made by the City Engineer, or as outlined in Section IIIH.

F. In the event that a property owner or developer desires to modify an existing pond or lake or desires to impound storm water by excavation, filling or construction of a dam within a property, for retention or detention, thereby creating a lake, pond, or lagoon or basin as a part of the planned development of that property, the standard provisions for storm drainage as established in Section III of this Ordinance shall be applicable, and shall also provide:

(1) That an engineering plan for such construction, accompanied by complete drainage design information, prepared by a registered professional engineer, shall have been approved by the City or Rowlett;

(2) That the owner or developer shall have agreed to retain under private ownership the lake, pond, or lagoon or basin constructed, and to assume full responsibility for the protection of the general public from any health or safety hazards related to the lake, pond, or lagoon constructed;

(3) That the owner or developer shall have agreed to assume full responsibility for the maintenance of the lake, pond, or lagoon or basin constructed;

(4) That the obligations herein shall run with the land and shall be a continuing obligation of the Owner or Owners of such land.

(5) That all Federal, State, and County laws pertaining to impoundment of surface water are complied with, including the design construction and safety of the impounding structure. Any Existing Structure which is included in a project development area shall be improved to comply with the applicable Federal, State, and County and City safety requirements for structures. The design flows shall be based upon the urbanized drainage flows which can result from a 100 year flood. All improvements shall be made to the dam structure at the expense of the developer, prior to acceptance of the adjacent street, utilities and drainage improvements as provided for under the Subdivision Ordinance.

(6) On any existing structure, the Owner will furnish a study by a professional Engineer to the City for approval prior to any proposed alteration. Compensatory storage shall be provided in some manner such that equal or comparable flood retention capacity is maintained.

G. The maintenance of Private Drainage Facilities shall be provided for by the property owner or assigned agent. The City shall be kept advised of the responsible agent.

H. All existing water seepage springs, or flowing water shall be connected into an underground storm sewer system, or they shall be discharged into an appropriate facility which is intended to carry storm water runoff. Such flow will not be permitted to discharge directly into the street gutter line.

I. Fences (Private and Public Screening) shall be constructed such that blockage of surface water flow does not occur. This includes the requirement that erosive conditions shall not be created around, under or near a fence structure.

J. The developer shall provide detail offsite drainage plans for the proper transition to natural ground or stream elevations. Criteria for onsite development shall apply to offsite improvements as required by the City Engineer.

SECTION V. - ENGINEERING DESIGN

A. Each storm drainage facility, including street capacities, shall be designed to convey the runoff which results from a certain prescribed design storm.

Drainage design requirements for open and closed systems shall provide protection for property during a storm having a 100-year recurrence interval with this projected flow carried in the streets and closed drainage systems in accordance with the following:

<u>Drainage Facility</u>	<u>Design Recurrence Interval</u>
Closed Storm Sewer Systems-----	10 yr. with emergency 100 yr. overflow
Closed Storm Sewer Systems at	
Street Low Point or Sag-----	25 yr. with emergency 100 yr. overflow
Culverts and Bridges-----	100 yr. (unless otherwise directed)
Concrete Lined Channels-----	50 yr. with emergency 100 yr. overflow
Earthen Channels-----	100 yr.

B. Computation of Storm Water Run-off for drainage areas less than 200 acres shall be by the "Rational Method", which is based on the principle that a maximum rate of run-off from a given drainage area for an assumed rainfall intensity occurs when all parts of the area are contributing to the flow at the point of discharge. The formula for calculation of run-off by the "Rational Method" is:

- Q = CIA, where
Q = the maximum rate of discharge expressed in cubic feet per second
C = a run-off coefficient which varies with the topography, soil, soil cover, land use and moisture content of the soil at the time the run-off producing rainfall occurs. This run-off coefficient shall be based on the ultimate use of the land as recommended by the

Land Use Plan for the City of Rowlett, and shall be selected from Table I herein on the basis of the use shown on land use and zoning map of the Comprehensive Zoning Ordinance for the City of Rowlett. If an area has had a change of Zoning to give the area land use for which the "C" in Table I is higher than use shown on land use and zoning maps, the higher "C" factor shall be used.

I = Rainfall intensity in inches per hour from the applicable curves of Figure 1. Time of Concentration or Duration of Rainfall for use in Figure 1 shall be calculated by velocity data shown in Table II.

A = The drainage area, expressed in acres, contributing to the run-off at the point in question. Calculation of the drainage area shall be made from an accurate topographic map, a copy of which shall be submitted with the engineering plans for approval.

For drainage areas in excess of 200 acres, where the use of "Rational Method" does not provide reliable data, the use of unit Hydrograph Flow Determination shall be made. The use of a unit Hydrograph calculation will be based upon standard and accepted Engineering Principles normally used in the Profession subject to the approval of the City Engineer. The Soil Conservation Service Technical Release Number 55 is an acceptable method.

Computation of run-off shall be based on a fully developed drainage area, or watershed, in accordance with the land use projected in the then current comprehensive land use plan for the City of Rowlett. The developer or builder shall develop their site development plans so that the rate of runoff created by the development of their property does not exceed the rate of runoff resulting from that which presently exists.

The runoff rate which will exit the project shall not be greater than that volume or velocity determined through the defined design criteria, as outlined in this Ordinance. When development can, or does provide direct drainage outlet works into Lake Ray Hubbard, consideration will be given to allow the design of storm runoff without detention, or retention within the project limits.

C. The two basic methods suggested for predicting the volume of runoff with time and the peak flow rate are the Rational Method and the Unit Hydrograph Method. The Rational Method may be used for drainage areas less than or equal to 200 acres. Drainage basins that exceed 200 acres must use the Unit Hydrograph Method. The Soil Conservation Service Technical Release Number 55 is an acceptable Unit Hydrograph Method.

When the Rational Method is used and detention is required, the volume of water supplied by the design storm may be calculated by converting the runoff rate, during a specific duration, to volume. The inflow volume should be determined for a period of at least twice the time of concentration for the site.

Retention and detention are two generalized types of storm runoff storage used to control the rate of runoff. All detention ponds should be designed to empty within a 24 hour period.

VALUES OF "C" FOR USE IN "RATIONAL METHOD" FORMULA $Q = CIA$

TABLE I

Slope	Land Use from Land Use Plan	Value of "C" (Run-off Coefficient)
<u>Flat Terrain</u> 0% to 1%	Park Areas - No Developable Land	0.20
	Park and School Land Tract	0.30
	Single Family Residential	0.45
	Duplex	0.50
	Multiple Family	0.55
	Local Business	0.65
	Central Business	0.80
	Commercial	0.80
	Industrial	0.75
<u>Moderate Terrain</u> 1% to 3-1/2%	Park Areas - No Developable Land	0.30
	Park and School Land Tract	0.40
	Single Family Residential	0.50
	Duplex	0.55
	Multiple Family	0.60
	Local Business	0.70
	Central Business	0.85
	Commercial	0.85
	Industrial	0.80
<u>Steep Terrain</u> 3.5% and over	Park Areas - No Developable Land	0.35
	Park and School Land Tract	0.45
	Single Family Residential	0.65
	Duplex	0.70
	Multiple	0.75
	Local Business	0.80
	Central Business	0.85
	Commercial	0.85
	Industrial	0.85

AVERAGE VELOCITY FOR USE IN DETERMINING TIME OF CONCENTRATION

TABLE II

Description of Water Course	0% to 3%	4% to 7%	8% to 11%	Over 12%
	V. in f.p.s.	V. in f.p.s.	V. in f.p.s.	V. in f.p.s.
Surface Drainage annels	5	9	13	15
Storm Sewers	Determine V. by Mannings Formula			
	Determine V. by Mannings Formula			

The data shown in Table II are average velocity of the run-off for calculating time of concentration or duration of rainfall for use in Figure 1. These average velocities in this table shall be used unless the designer shows calculation of velocities by streets and/or storm sewers, or overland flows.

Using the average velocities from this table, the designer shall calculate the time of concentration by the following formula unless more data is shown on the plans for calculating time of concentration.

"Inlet Time" = 5 minutes for property zoned for multiple family, local business, central business, commercial or industrial; 10 minutes for property zoned for parks, schools, single family residential and duplex.

$$T = \text{"Inlet Time"} + \frac{D}{V \times 60} \quad \text{Where:}$$

T = Time of concentration in minutes for use in Figure 1.

D = Distance in feet from point of concentration to upper end of drainage area under consideration.

V = Velocity in feet per second from this table or velocity calculated by designer by streets and/or storm sewers.

The existing soils are such that erosive conditions are created at certain velocities. The following velocities are considered to be maximum acceptable design conditions:

Earth (with no concrete protection)	0 to 5 feet per second
Shale	5 to 6 feet per second
Rock	6 to 10 feet per second

D. The minimum curb inlet size shall be eight (8) feet in length with a capacity of 8 cfs.

E. The construction of all improvements shall be in accordance with the standards set forth in the current Paving and Drainage Specifications Handbook, and Design Standards of the City of Rowlett. The frequency chart in years (Figure 1), the Inlet Capacity for low point inlets (Figure 2), the drainage capacity road sections (Figure 3), and the City Criteria are hereby adopted as a part of this Ordinance.

F. Complete engineering plans for storm drainage facilities shall be prepared by a professional engineer registered in the State of Texas and experienced in civil engineering work. The total cost for such engineering plans and specifications shall be borne by the Owner or the Developer and shall be furnished to the City Engineer for his review and approval.

G. In any development, alteration, or improvement of property, the Owner may be required to provide, at his expense, a preliminary drainage study for the total area to be ultimately developed. This study shall be submitted to the City Engineer as a part of the submitted data for consideration of preliminary plat, or site plan approval.

SECTION VI. - CONSTRUCTION IN AREAS SUBJECT TO FLOODING

A. In all areas subject to flooding, the finished floor elevation shall be a minimum of two feet above the high water elevation calculated for the run-off from a rainfall having a recurrence interval of 100 years, in a completely developed watershed. The owner/developer shall furnish, at his expense to the City Engineer, sufficient engineering information to confirm that the minimum floor elevations proposed are as required by this paragraph. Residential construction permits will not be issued until lots and/or sites are elevated from the flood plain in accordance with F.I.M.A. approved revision.

B. No building or structure, excavation, filling, or construction of embankment or landscaping shall be permitted within a flood plain or channel which will increase water surface elevations or obstruct natural flow of water within that flood plain or channel, unless sufficient engineering design information is furnished to the City Engineer in order that he may determine that same will not adversely affect flow characteristics within that flood plain or channel, resulting in damage to that or any other property nearby.

C. The provisions of the City's current Flood Hazard Prevention Ordinance (F.I.M.A. criteria) shall be observed in preparing land development plans.

D. New construction and substantial improvement of any commercial, industrial or other non-residential structure shall have the lowest floor, including basement, elevated to the level of the base flood elevation, plus two (2.0) feet.

SECTION VII. - BUILDING OR STRUCTURE SET-BACK REQUIREMENT

No building or structure, including fences, shall hereafter be constructed, reconstructed, or relocated within twenty (20) feet of any open drainage channel. It is the intent of this section to insure that an unobstructed width of at least twenty (20) feet is maintained between the top of the high bank of any such drainage channel and any building or structure. (See also Section III).

SECTION VIII. - MINIMUM LOT AND FLOOR ELEVATIONS

Minimum lot and floor elevations shall be established as follows:

1. Lots abutting a natural or excavated channel shall have a minimum elevation for the buildable area of the lot at least equal to the highest elevation of the drainage floodway easement, and a finished floor elevation at least two (2) feet above the 100-year design storm or F.I.M.A. floodway elevation, whichever is greater. The minimum finished floor elevation shall be set at an elevation of two (2) feet above the top of curb elevation, except when the terrain feature slopes, such that drainage is not a critical element to the project.

2. Where lots do not abut a natural or excavated channel, minimum floor elevations shall be a minimum of one (1) foot above the street curb or edge of alley, whichever is lower, unless otherwise approved by the City Engineer. Where a lot is adjacent to a drainage flume or channel, the finished floor shall be a minimum of two (2) feet above the high water elevation. Where the structure is below a street or alley, the builder shall grade and construct facilities such that a positive drainage system of swales are capable of discharging the resultant flows which may flow across the yard area into the structure.

3. The minimum finished floor elevation shall be shown on the final file plat for record purposes. Prior to final acceptance of utilities and street construction by the City, a certified statement shall be prepared by a Registered Public Surveyor showing all lot elevations, as developed within the subject project, meet or exceed the required minimum finished floor elevations. This certification shall be filed with the City Engineer.

4. Existing platted property which is subject to flooding or carries a specified or recorded minimum finished floor elevation shall be surveyed by a Registered Public Surveyor prior to obtaining a building permit. The certified survey data shall be furnished to the City Engineer for approval. Certificate of Compliance with the provisions of this ordinance pertaining to specified finished floor levels shall be required.

SECTION IX. - BUILDING PERMITS, PLAT & SITE PLAN APPROVAL TO BE WITHHELD

No Building Permit shall be issued, nor plat or site plan approval, nor Certificate of Occupancy approved for any construction, reconstruction, or development upon any land where such construction, reconstruction or development is not in conformity with the requirements and intent of this Ordinance. Anyone who violates any of the terms and provisions of this Ordinance shall be denied a Building Permit until the violation is corrected. Residential construction permits will not be issued until lots and/or sites are elevated from the flood plain by F.I.M.A. approved revisions.

SECTION X. - MAINTENANCE GUARANTEE

The Contractor shall guarantee the work which he does against defective workmanship and materials for a period of one (1) year from the date of final acceptance by the City.

Where defective workmanship and/or materials are discovered requiring repairs to be made under this guarantee, all such repair work shall be done by the Contractor at his own expense within five (5) days after written notice of such defect has been given to him by the City. Should the Contractor fail to make repair or correct such defective workmanship and/or materials within five (5) days after being notified, the City may make the necessary repairs and charge the Contractor with the actual cost of all labor and materials required.

The Contractor shall provide a performance bond for a period of one (1) year time period after the date of acceptance of the work to cover his guarantee as set forth above.

SECTION XI. - REPEALING CLAUSE

That all ordinances of the City of Rowlett in conflict with the provisions of this ordinance be, and the same are hereby, repealed and all other ordinances of the City of Rowlett not in conflict with the provisions of this ordinance shall remain in full force and effect.

SECTION XII. - SEVERABILITY

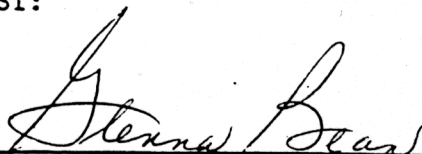
If any section, paragraph, clause, phrase, or provision of this Ordinance shall be adjudged invalid or held unconstitutional, the same shall not affect the validity of this Ordinance as a whole or any part or provision thereof, other than the part so decided to be invalid or unconstitutional; nor shall such unconstitutionality or invalidity have any effect on any other ordinances or provisions of ordinances of the City of Rowlett.

SECTION XIII. - EMERGENCY

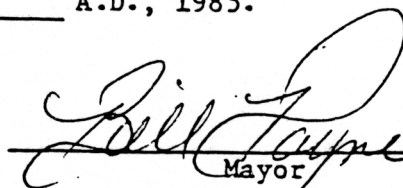
That the present ordinances of the City of Rowlett are inadequate to provide for adequate storm drainage facilities and flood control in the development of properties within such city, constitutes an urgency and emergency in the interest of public health, safety, and welfare, and necessitates that this Ordinance become effective immediately from and after its date of passage as the law in such cases permits.

PASSED AND APPROVED by the City Council of the City of Rowlett, Texas, on this the 6th day of August A.D., 1985.

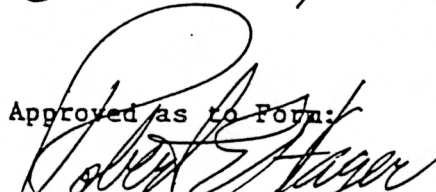
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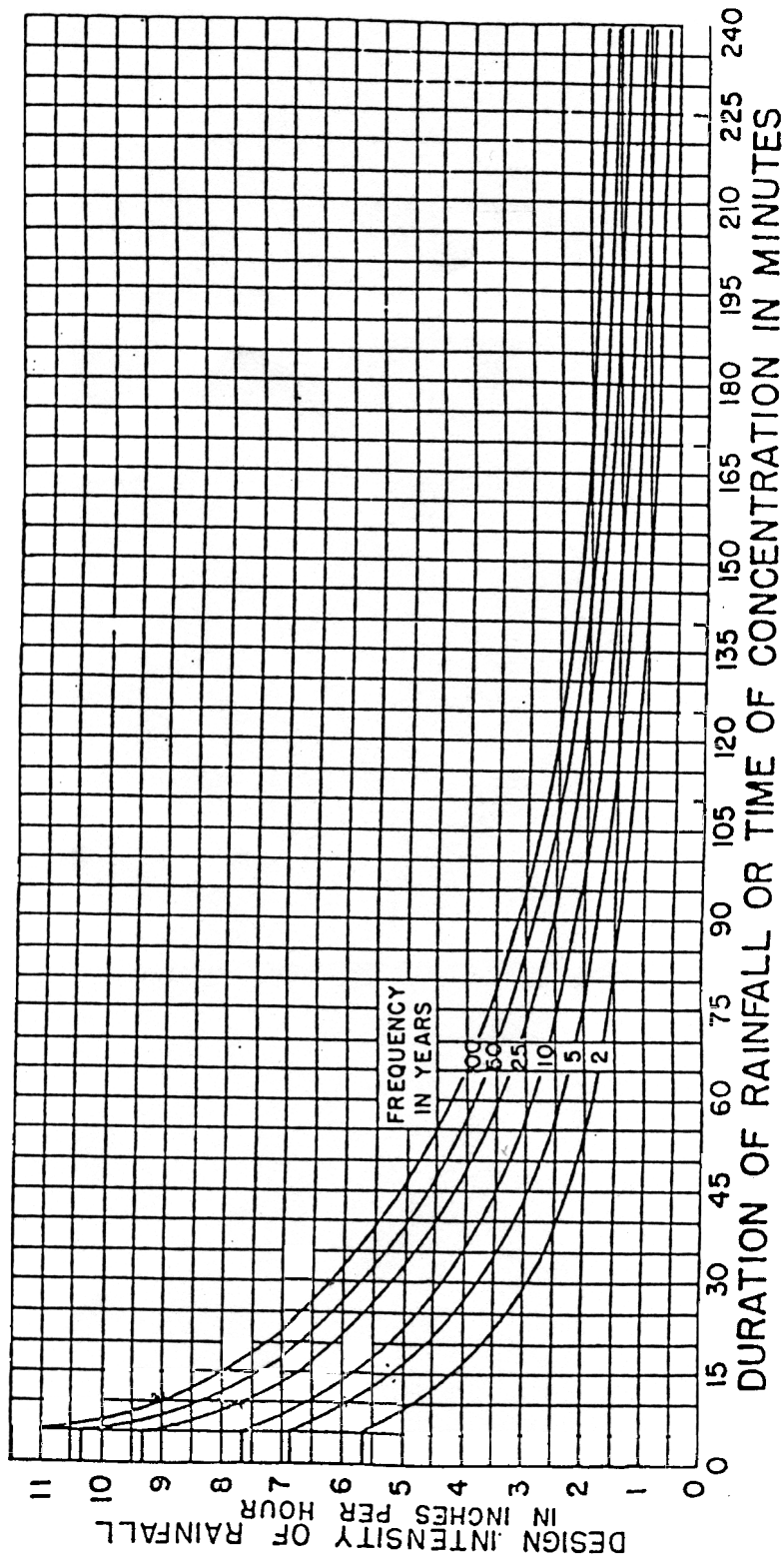
City Secretary



Mayor

Approved as to Form:


City Attorney



FREQUENCY
CHART IN
YEARS

FIGURE 1

CITY OF ROWLETT,
TEXAS

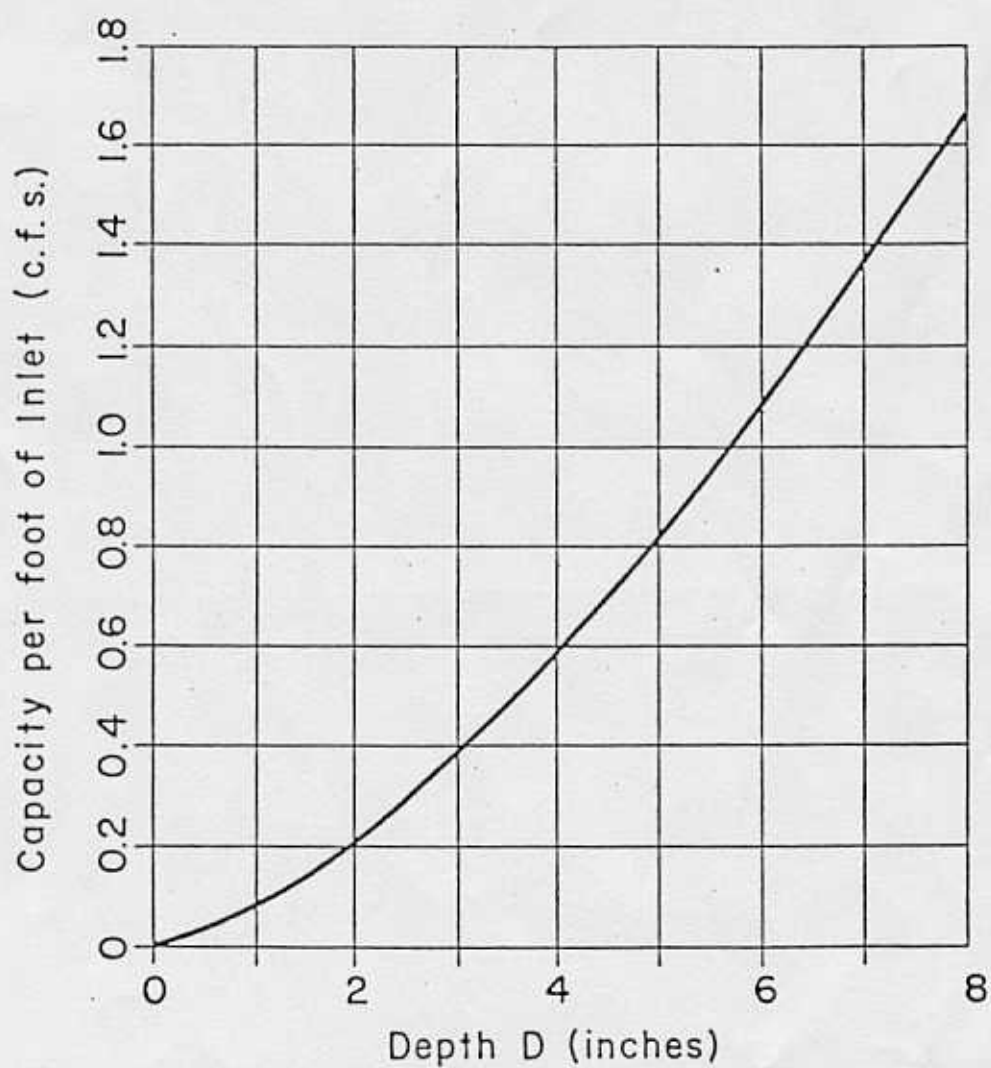
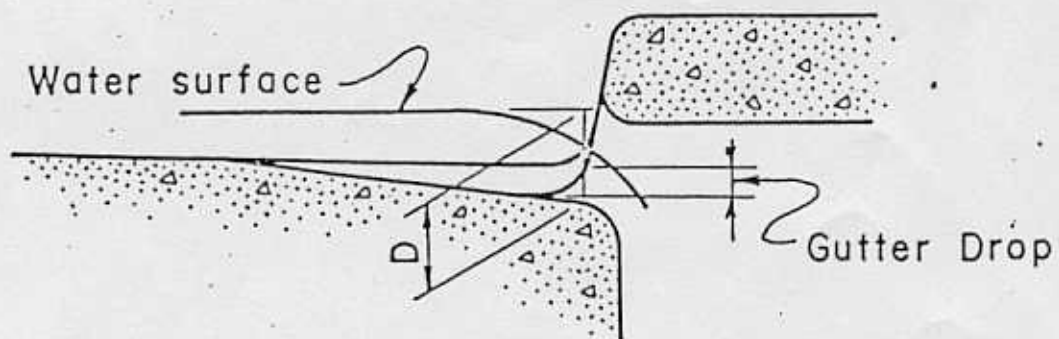


FIGURE 2

INLET CAPACITY
FOR
LOW POINT INLETS

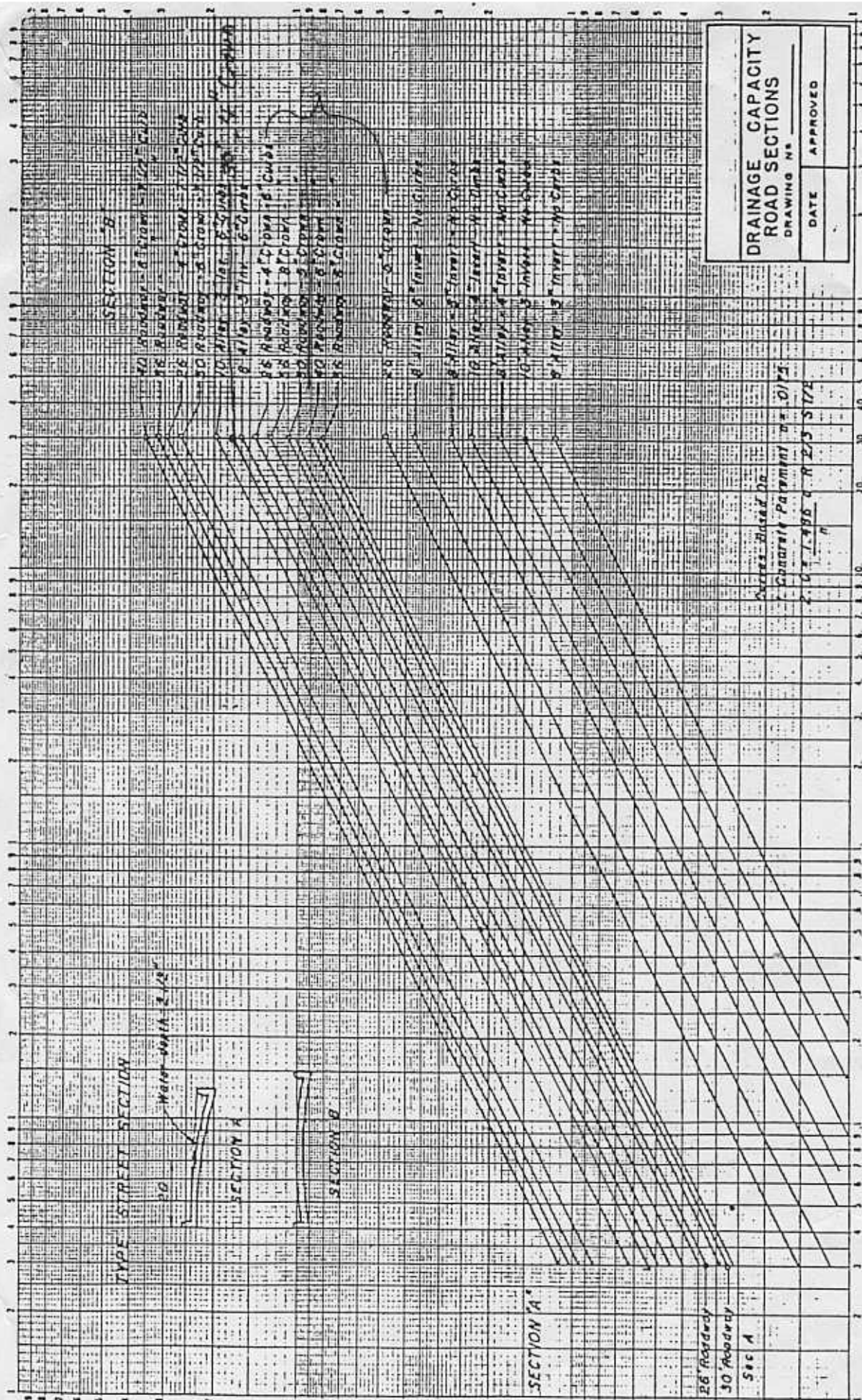


FIGURE 3